

Enterprise PI Enabling an Integrated Manufacturing Landscape

Barry Higgins - Janssen Biologics Ireland

- Background
- Enabling MES
- Introducing PI Asset Framework (PI AF)
- MES data interface using PI AF

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- 3 Main areas:
 - Consumer
 - Medical devices & diagnostics
 - Prescription Products
- JSC API Supply Chain.
 - Chemicals – 6 sites
 - Biologics – 5 sites

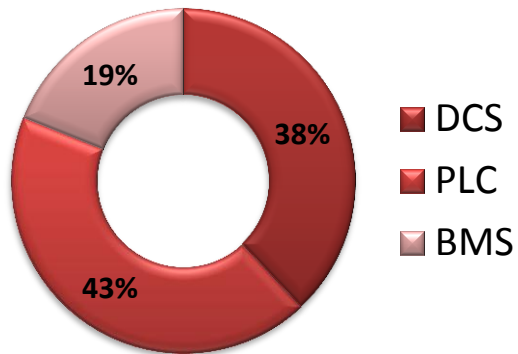


Johnson & Johnson

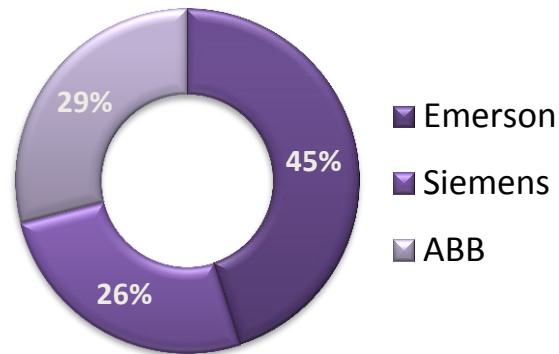
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Control Systems Overview

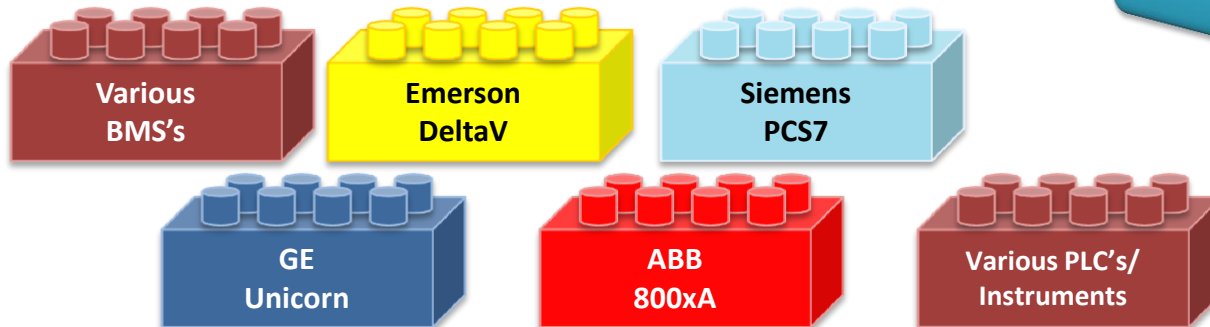
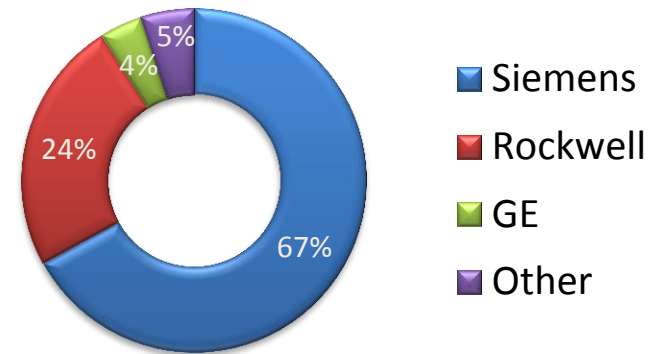
JSC API - PCS Landscape



JSC API – DCS Vendors



JSC API – PLC Vendors

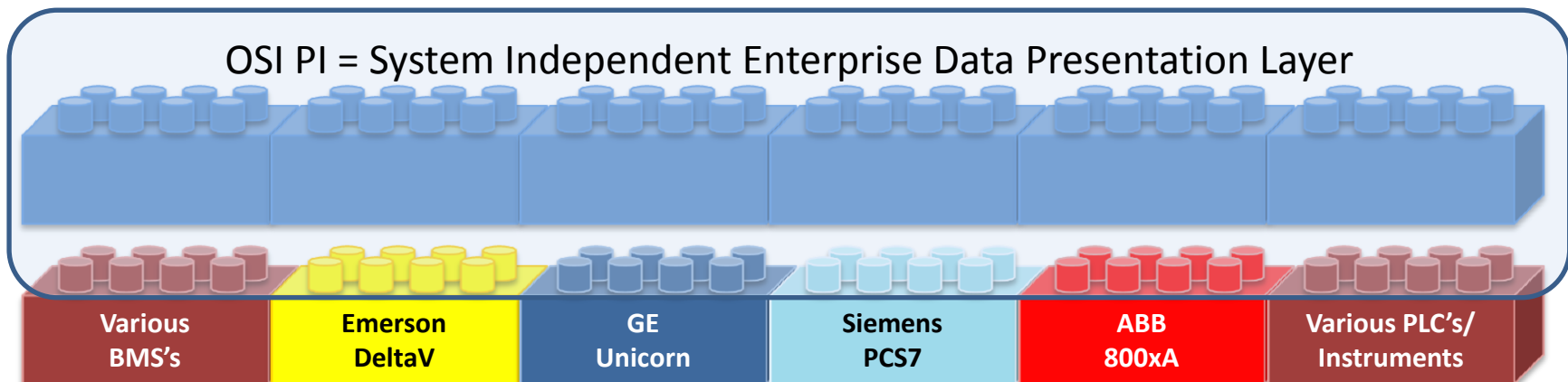


Process Control System(s)

Why do we need the OSIsoft PI System?



- Very disparate systems landscape
 - ranging from distributed process control systems with inherent historian capability to stand-alone instruments with paper printouts
- Require capability to capture and aggregate data for visualisation, reporting & analysis



- Get away from counting “tags”
- Collect all data (GMP & non-GMP)
 - Process, Alarm & Events, Batch Events
- Deliver a consistent infrastructure globally
 - no differentiation from Commercial to R&D
- Provide common visualisation (thick & thin clients)
 - Consolidated data visualization for improved process monitoring and historical batch analysis
 - Consolidated alarm reporting for building management, process control, laboratory equipment, utility systems, warehouse equipment...
- Targeted compliant reporting (RtReports)
 - Autoclaves, washers (non-MES related!)

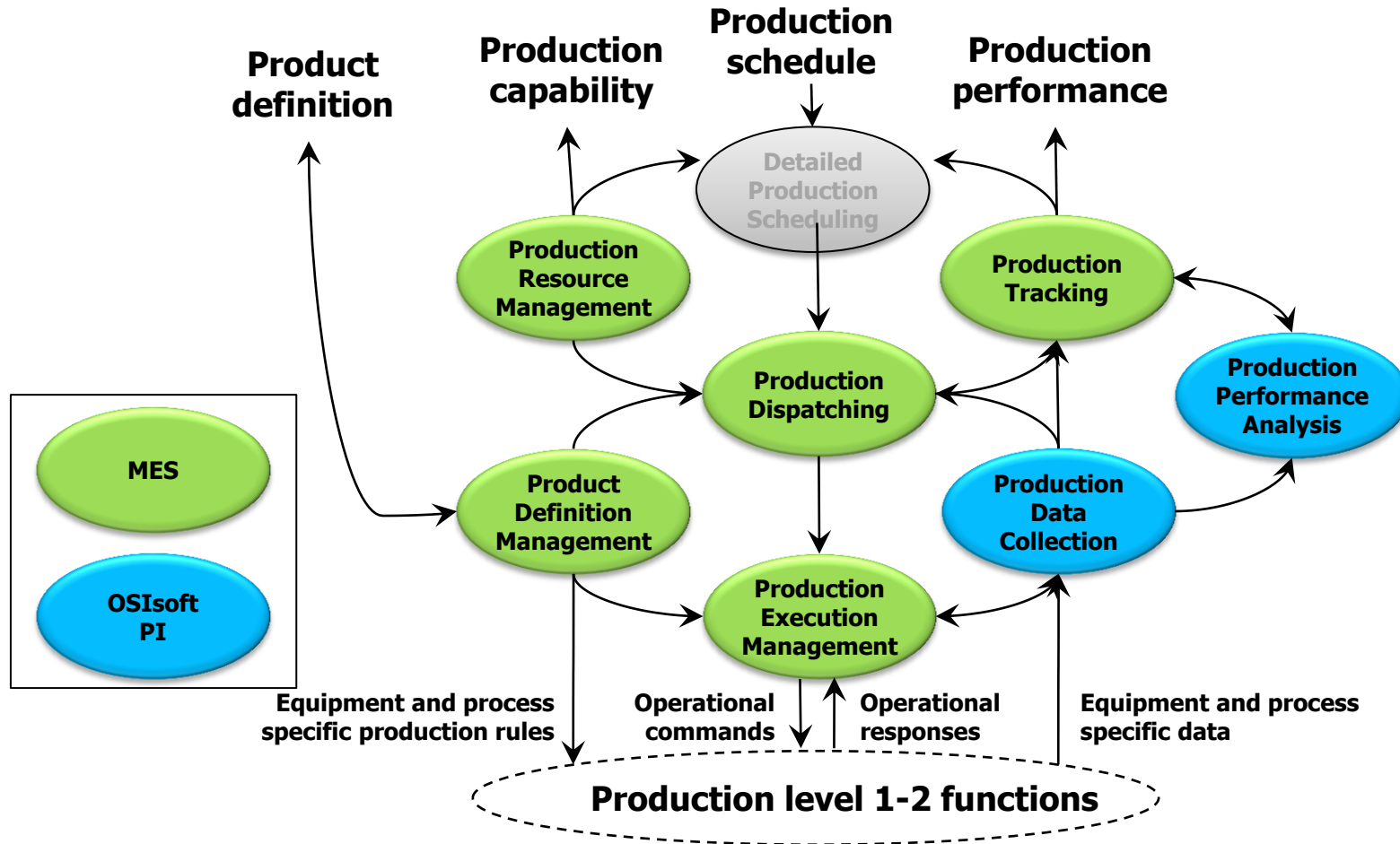
Systems Landscape Positioning



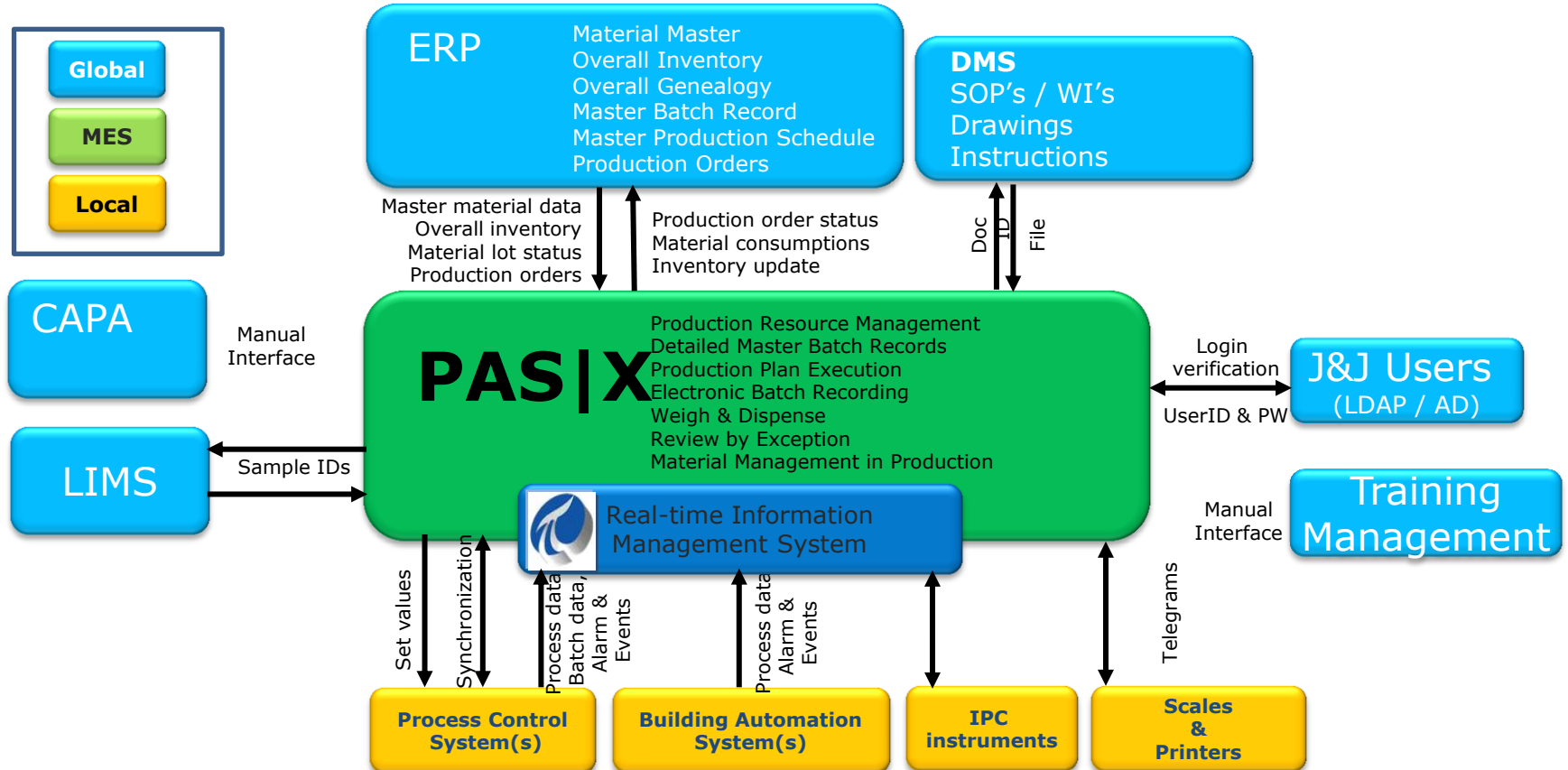
CDS: Chromatography Data Software
ELN: Electronic Laboratory Notebook
ERP: Enterprise Resource Planning
LES: Laboratory Execution System
LIMS: Laboratory Information Management System
MES: Manufacturing Execution System
PCS: Process Control System
PIMS: Production Information Management System

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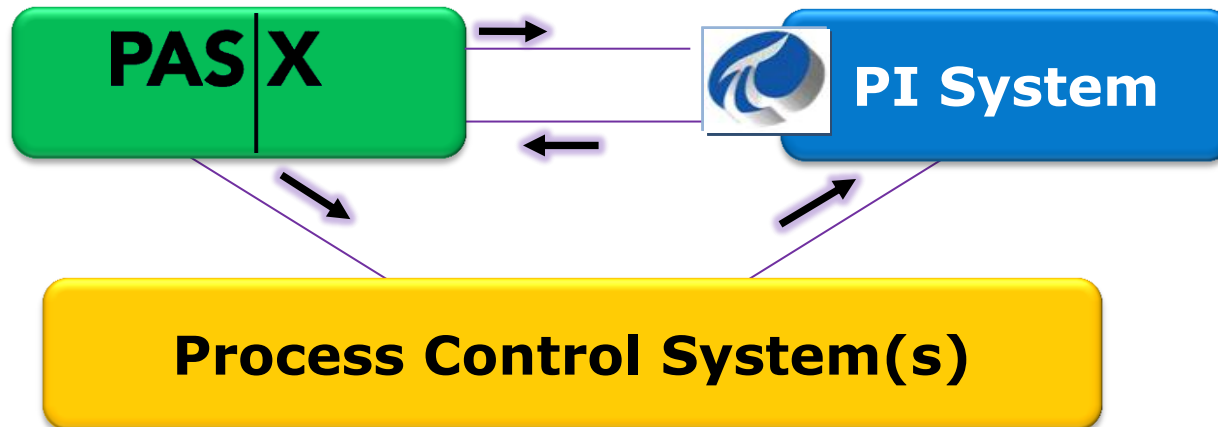
Where does the PI System fit ?



Enabling MES

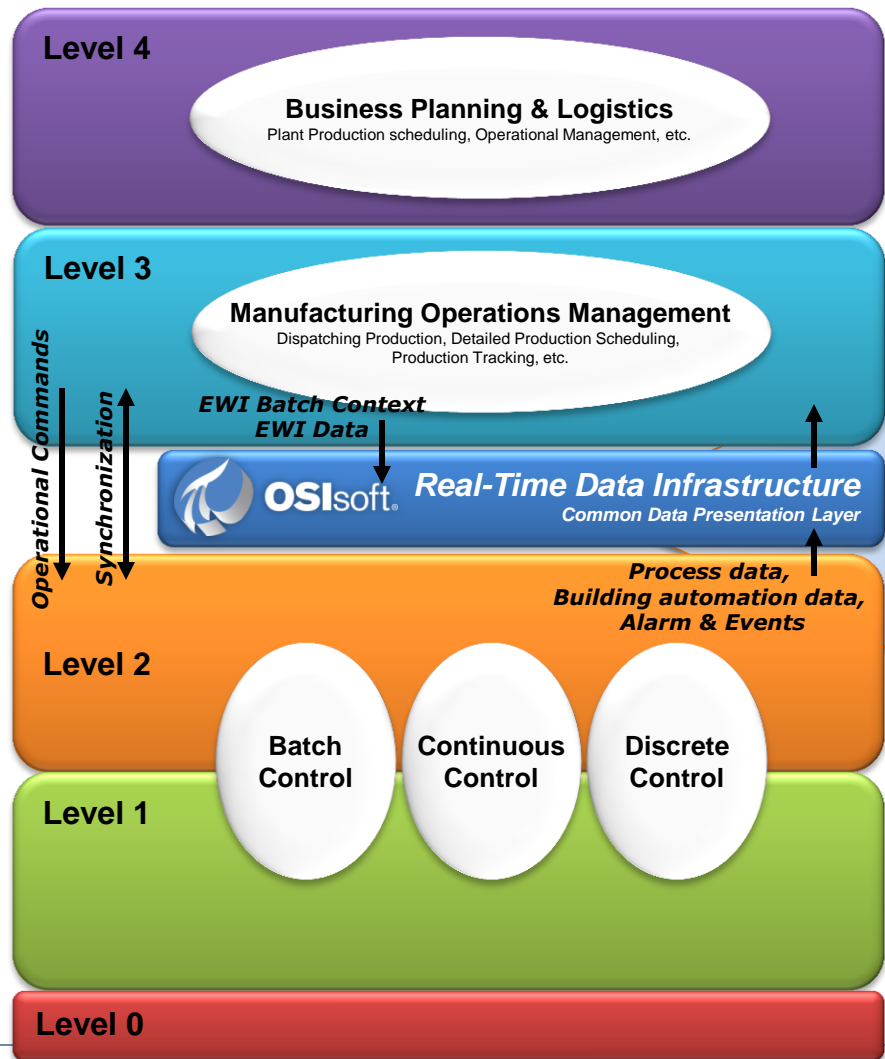


- PAS|X Commands & setpoints to Process Control System
- Process Data collected in the PI System
- The PI System data referenced in the PAS|X EBR
- PAS|X EBR batch execution data referenced in the PI System.

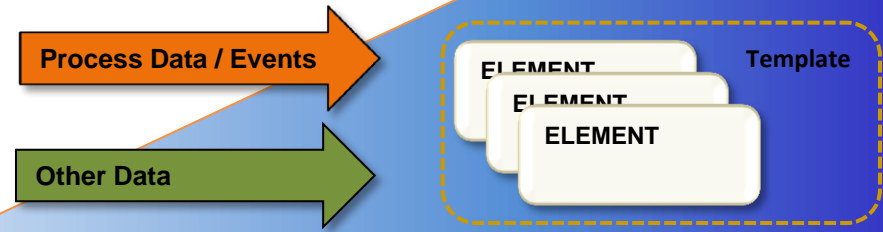


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- **Introducing PI Asset Framework (PI AF)**
- MES data interface using PI AF

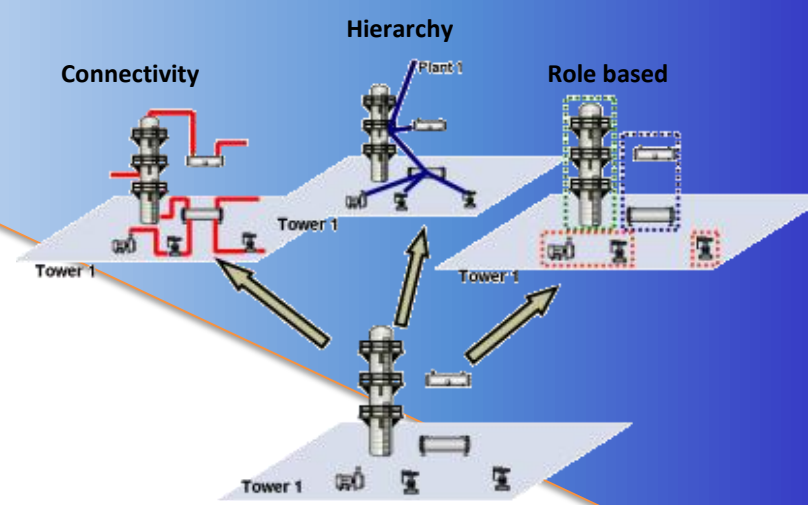
S95 Model



Template Based Data Abstraction Layer

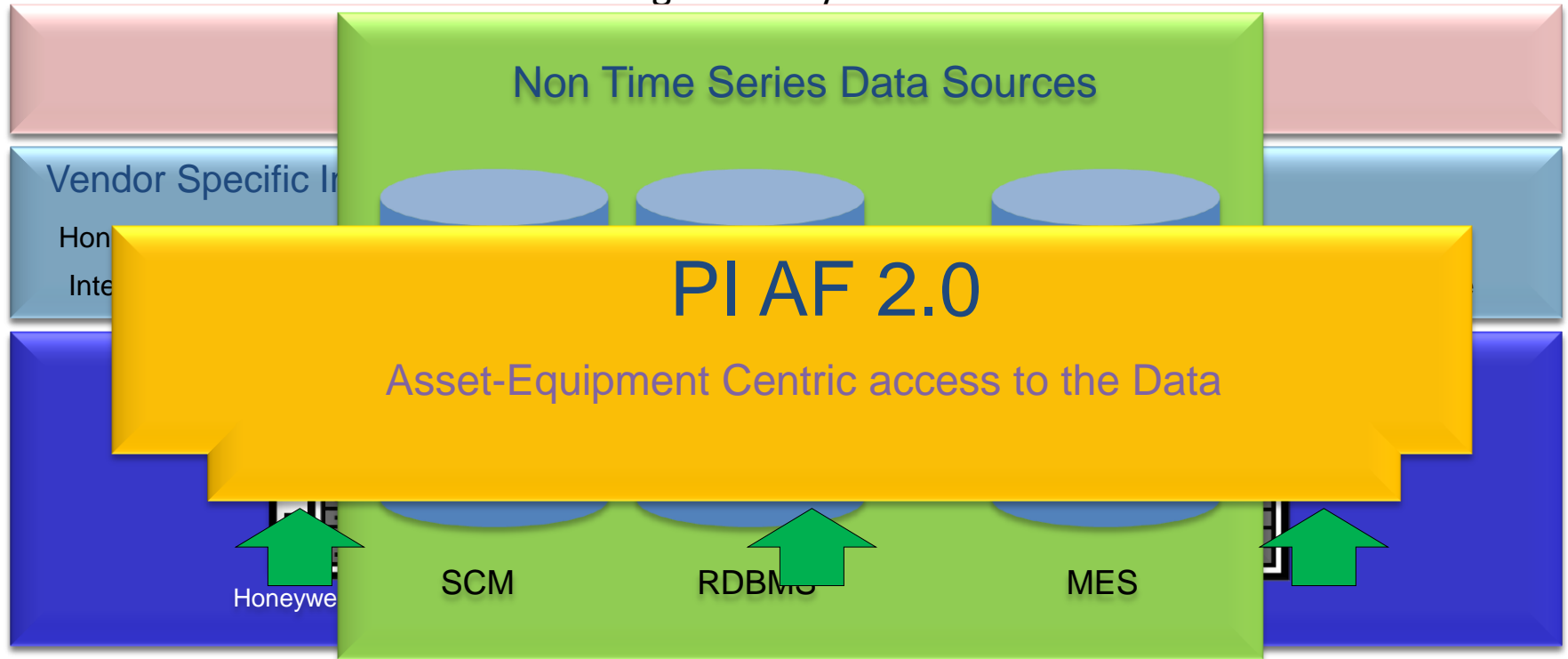


Assets



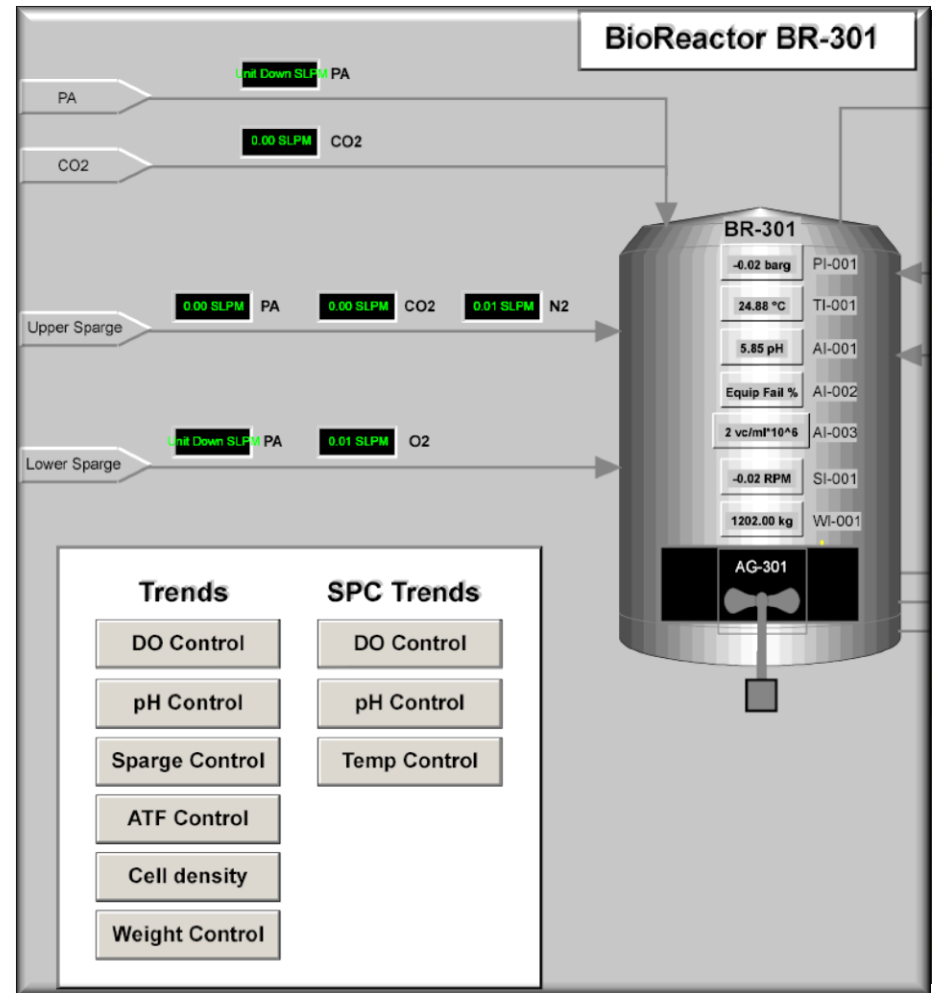
Collections of reusable Elements

- Data structured and organized by asset

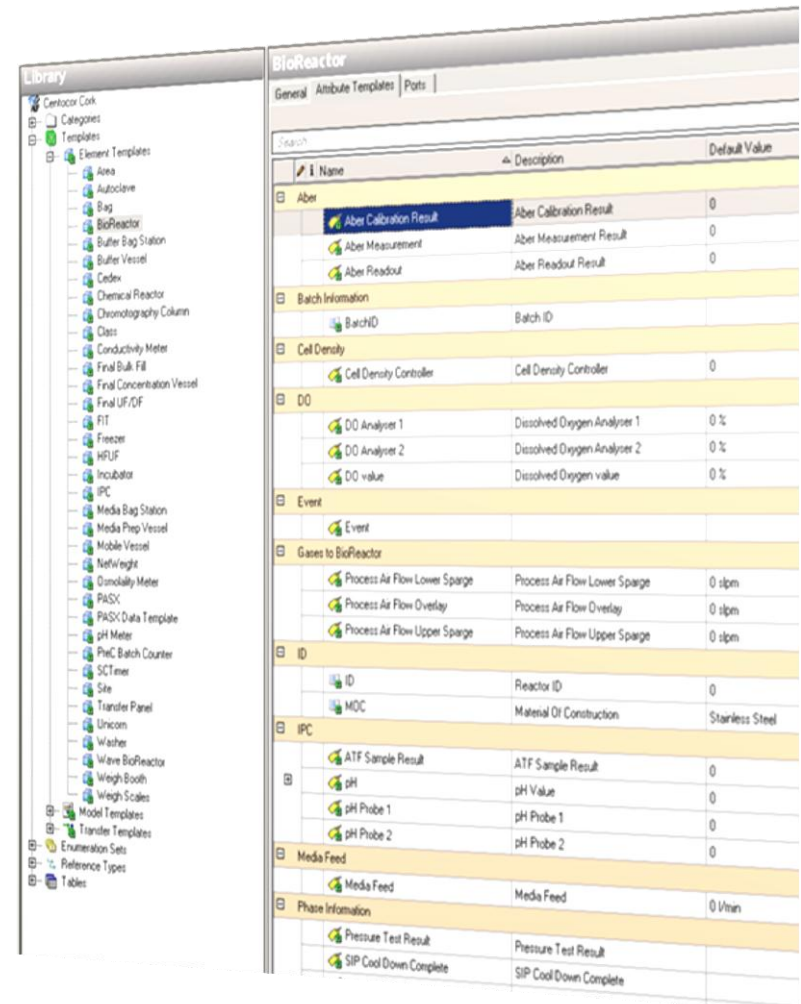


Introducing PI Asset Framework

- What is PI Asset Framework ?
 - “Process Object Models” which represent the logical components in your process.
 - Allows data from multiple PI servers to be combined in one common view.
 - Allows the user access to non PI data sources, e.g. external databases.
 - Allows process specialists to build process relative models without the need for extensive PI System knowledge.



- Super Class concept.
 - Class based templates - built in conjunction with process and subject matter experts.
 - Only process critical information grouped together in a logical model.
 - Ensures that the entire organisation have a common taxonomy.
- PAS|X \ PI AF
 - Using Unit based templates allows us to build unit based MBR elements that can be applied on other sites.



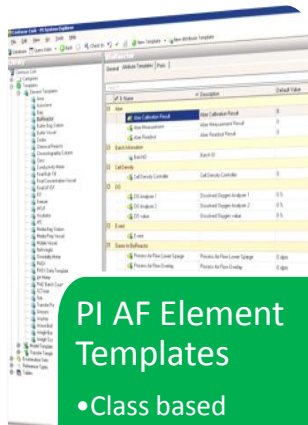
The screenshot displays the 'BioReactor' template in the PI AF software. The left pane shows a hierarchical tree of templates, including 'Area', 'Autoclave', 'Bag', 'BioReactor', 'Buffer Bag Station', 'Buffer Vessel', 'Cedex', 'Chemical Reactor', 'Chromatography Column', 'Class', 'Conductivity Meter', 'Final Bulk Fill', 'Final Concentration Vessel', 'Final UF/DF', 'FIT', 'Freezer', 'HPLC', 'Incubator', 'IPC', 'Media Bag Station', 'Media Prep Vessel', 'Mobile Vessel', 'NetWeight', 'Osmolality Meter', 'PASX', 'PASX Data Template', 'pH Meter', 'pH Batch Counter', 'SCTimer', 'Site', 'Transfer Panel', 'Unicom', 'Washer', 'Wave BioReactor', 'Weigh Booth', 'Weigh Scales', 'Model Templates', 'Transfer Templates', 'Enumeration Sets', 'Reference Types', and 'Tables'.

The right pane shows the 'BioReactor' template details, including a table of elements and their default values.

Name	Description	Default Value
Aber		
Aber Calibration Result	Aber Calibration Result	0
Aber Measurement	Aber Measurement Result	0
Aber Readout	Aber Readout Result	0
Batch Information		
BatchID	Batch ID	
Cell Density		
Cell Density Controller	Cell Density Controller	0
DO		
DO Analyzer 1	Dissolved Oxygen Analyser 1	0 %
DO Analyzer 2	Dissolved Oxygen Analyser 2	0 %
DO value	Dissolved Oxygen value	0 %
Event		
Event		
Gases to BioReactor		
Process Air Flow Lower Sparge	Process Air Flow Lower Sparge	0 slpm
Process Air Flow Overlay	Process Air Flow Overlay	0 slpm
Process Air Flow Upper Sparge	Process Air Flow Upper Sparge	0 slpm
ID		
ID	Reactor ID	0
MOC	Material Of Construction	Stainless Steel
IPC		
ATF Sample Result	ATF Sample Result	0
pH	pH Value	0
pH Probe 1	pH Probe 1	0
pH Probe 2	pH Probe 2	0
Media Feed		
Media Feed	Media Feed	0 l/min
Phase Information		
Pressure Test Result	Pressure Test Result	
SIP Cool Down Complete	SIP Cool Down Complete	

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From PI AF to MES and back



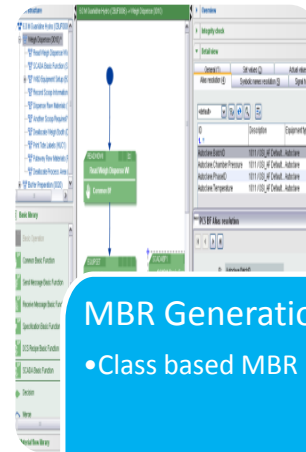
PI AF Element Templates

- Class based template.
- Unit Elements created from template.



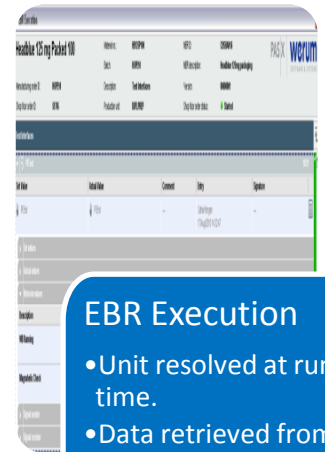
Upload from PI AF

- Class based PCS MBR elements
- Building blocks for MBR modellers



MBR Generation

- Class based MBR



EBR Execution

- Unit resolved at run-time.
- Data retrieved from PI AF Unit Element



Acknowledgements:

J&J:

Terry Murphy
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Marc Gallant
Glenn Hummell
Chris Nelson



TQS:

Tom Quilty
Cathal Horgan

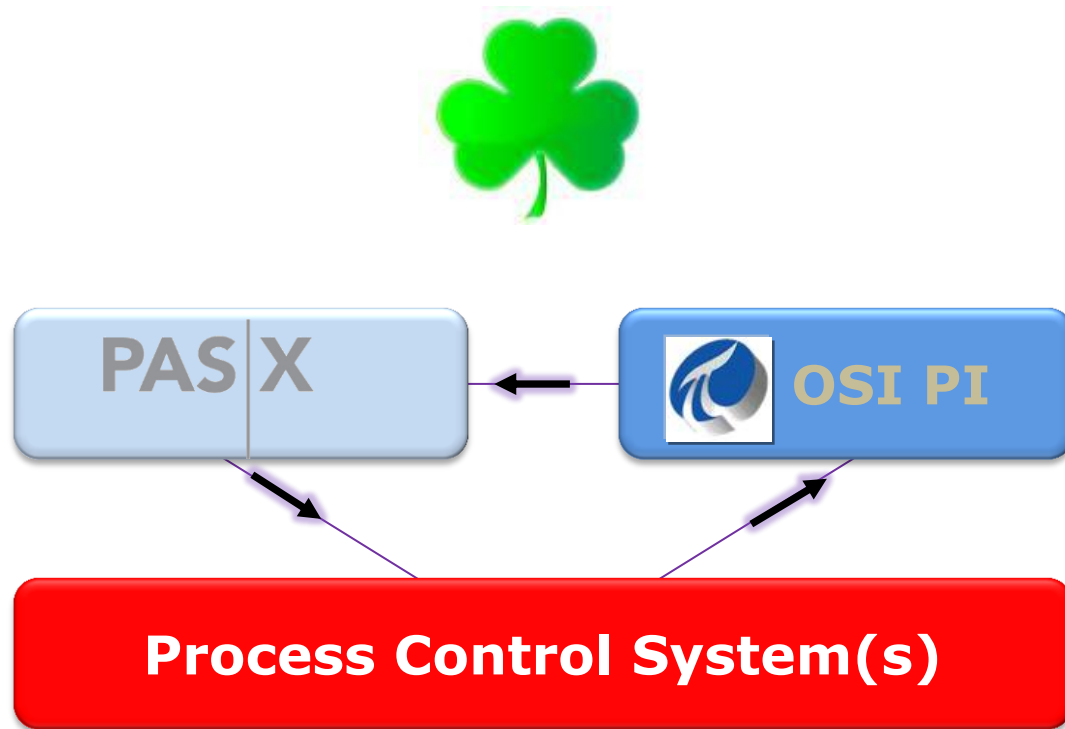
Thank you

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777 Davis St., Suite 250 San Leandro, CA 94577

The New Trinity!

- PAS|X Commands & setpoints to Process Control System
- Process Data collected in OSI PI
- OSI PI data referenced in the PAS|X EBR

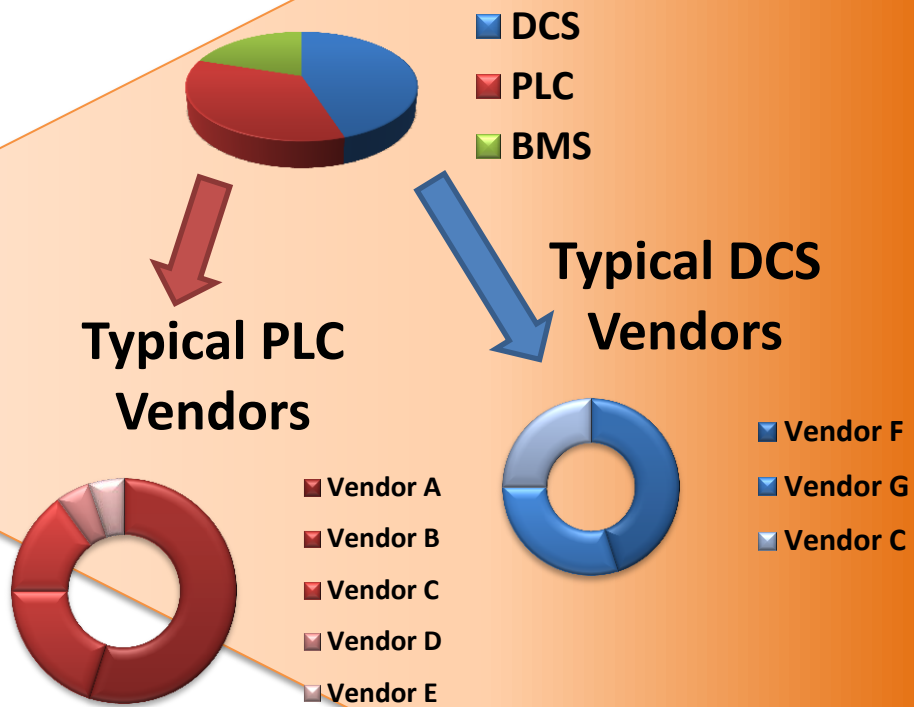


Challenges at Level 2: Variable Control System Landscape

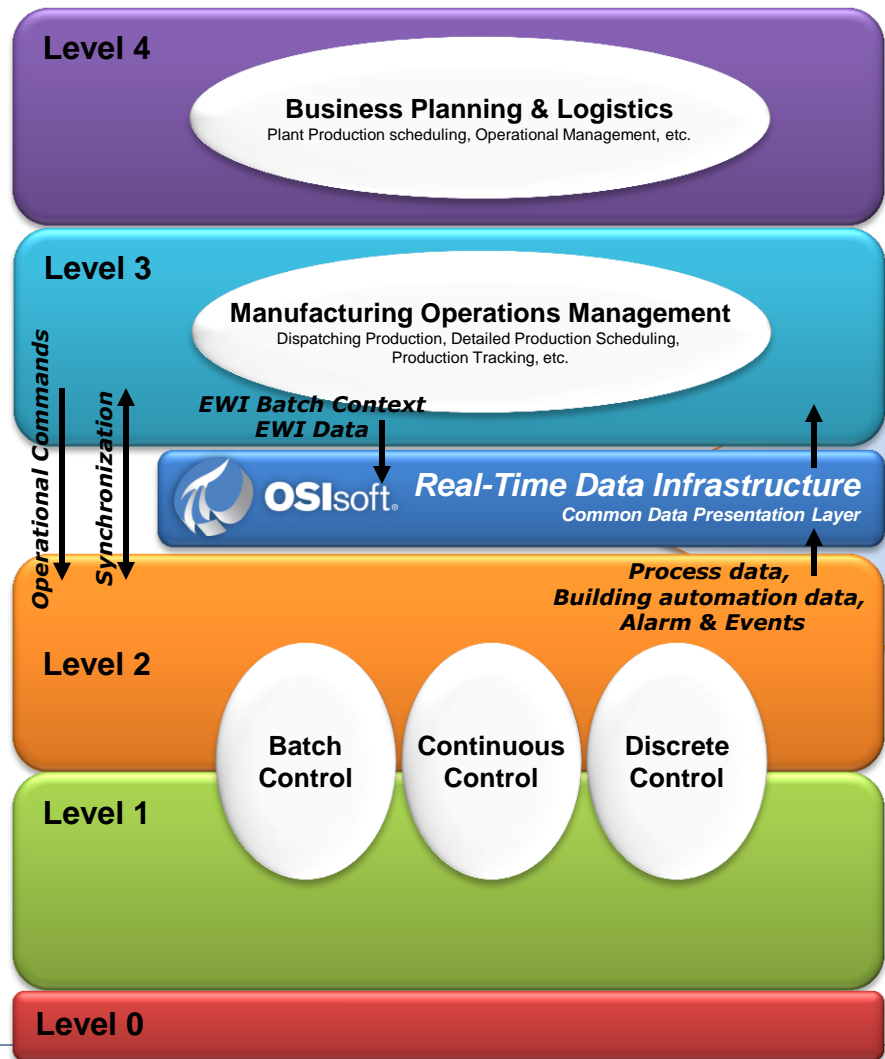


Variable PCS Landscape

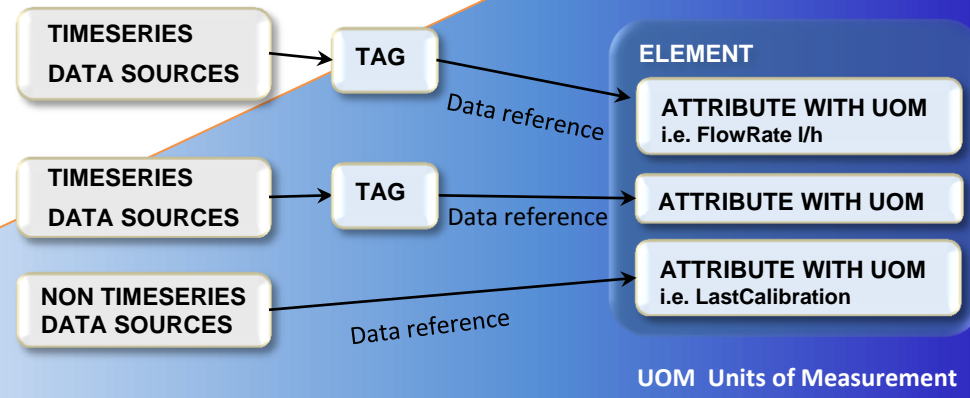
Typical Process Control System Landscape



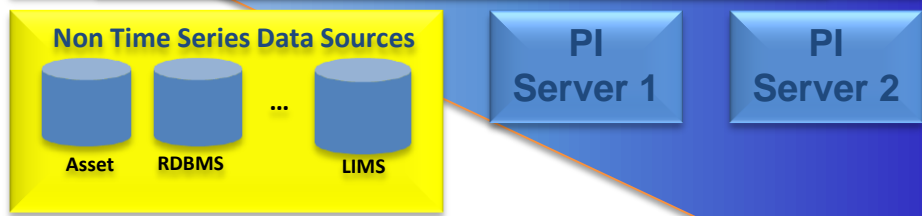
S95 Model



Link Templates to Plant Data

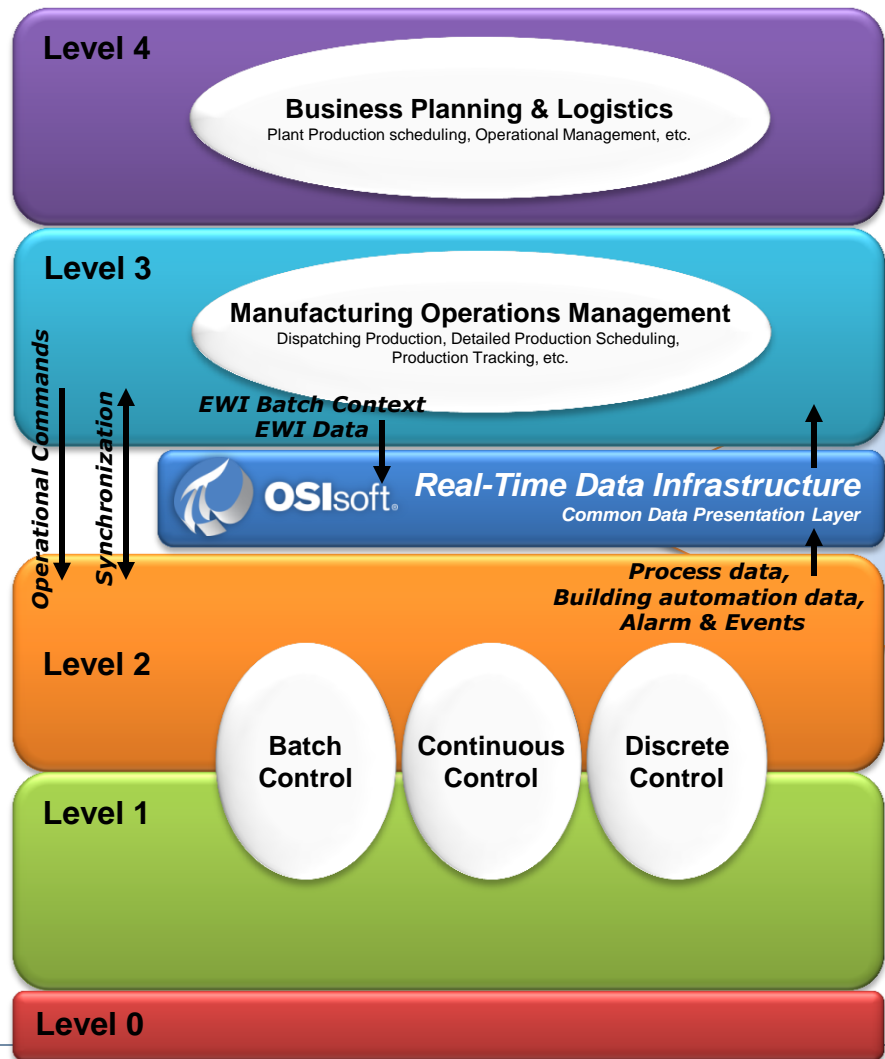


Asset/Equipment centric access to information

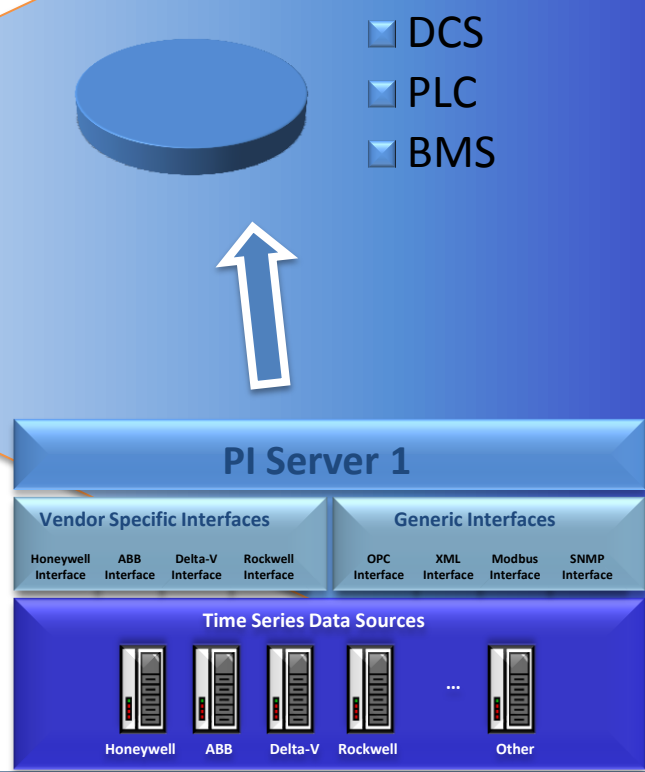


S95 Model

Common Infrastructure for Collecting Data

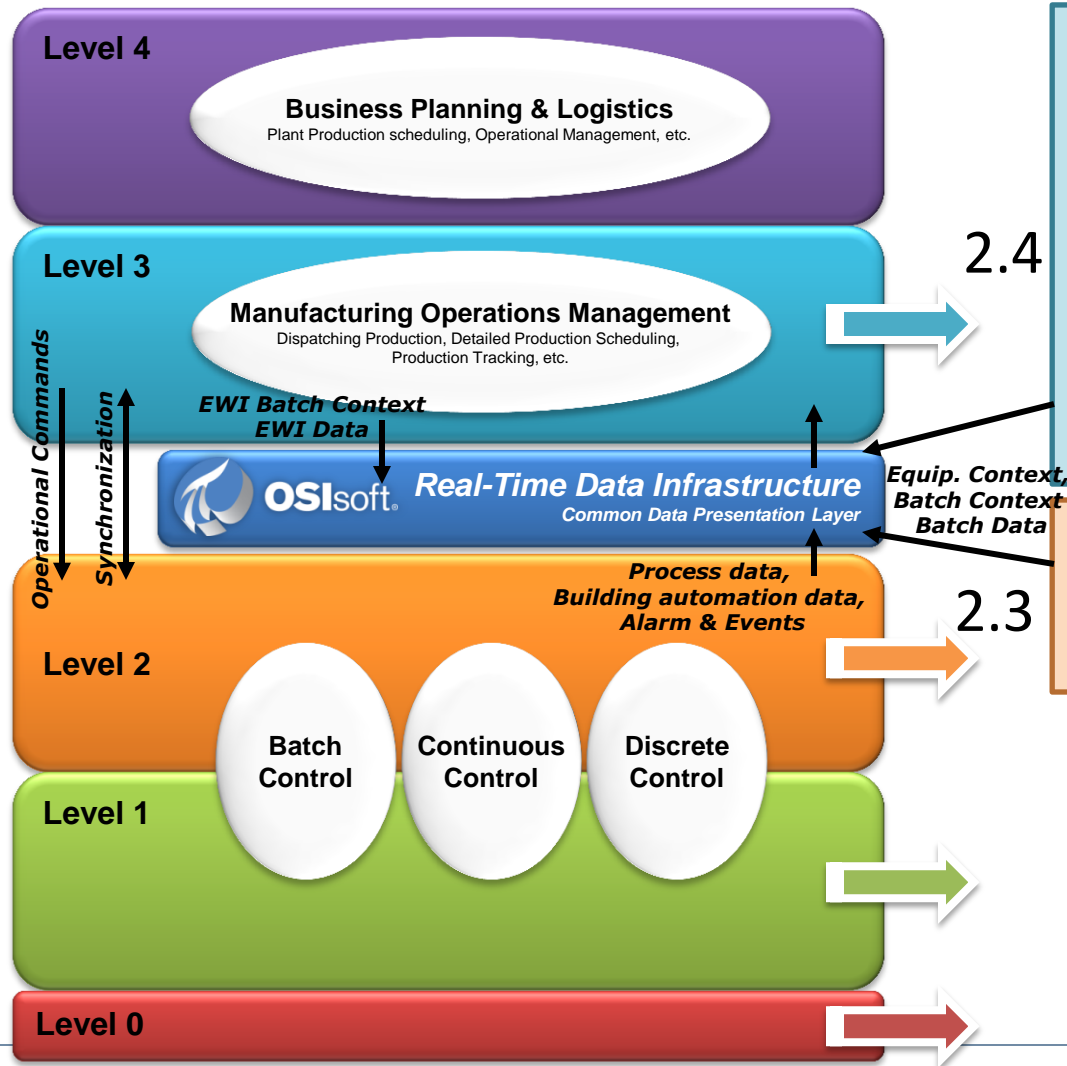


Process Control System Landscape with PI

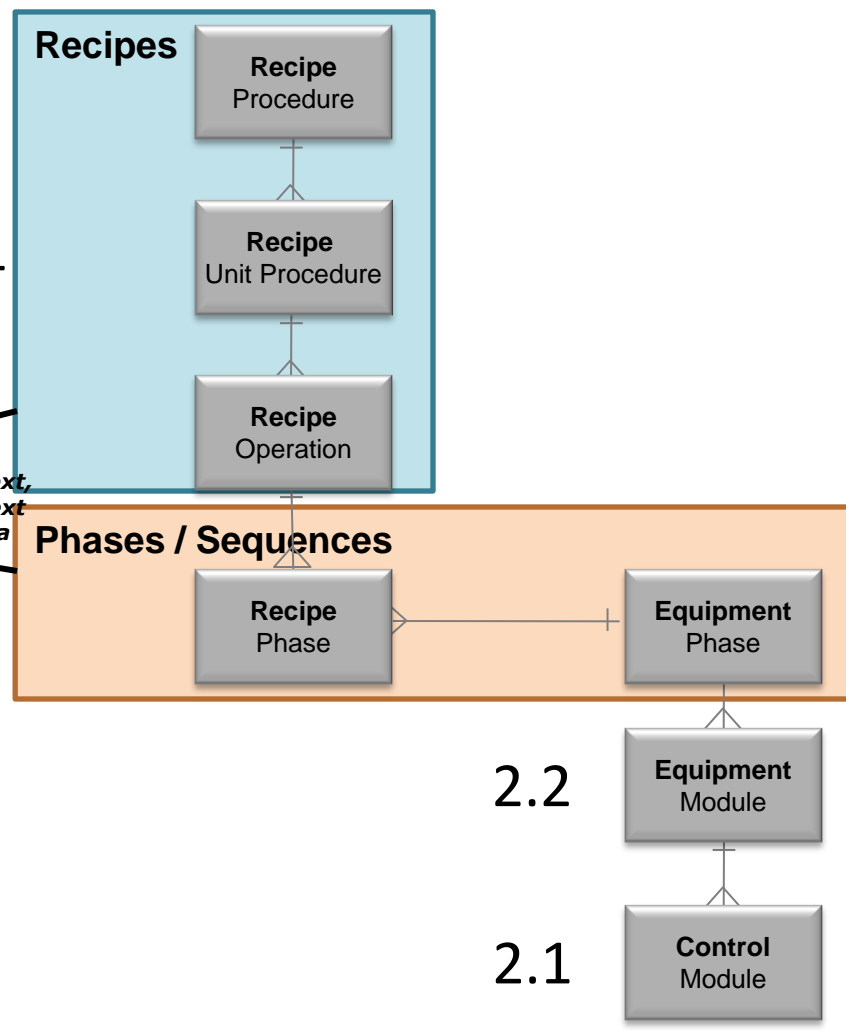


Value now. Value over time.

S95 Model



S88 Model



Value now. Value over time.